

What is claimed is:

1. A method for transmitting a message between an asynchronous mobile communication system and at least a core network, the mobile communication system having a mobile station and a radio network, the method comprising the steps of:

a) at the radio network, discriminating an operating type of a core network(s) coupled thereto;

10 All? b) at the radio network, generating and transmitting a system information message having core network operating type information and information related to the core network;

15 c) at the mobile station, discriminating the operating type of the core network(s) based on the system information message;

d) if one core network is coupled to the asynchronous mobile communication system, operating a call control entity and a mobility management entity according to the operating type of the core network;

20 e) if two or more core networks are coupled to the asynchronous mobile communication system, at the mobile station, selecting one core network to be communicated with, based on the system information message;

25 f) operating a call control entity and a mobility management entity according to an operating type of the selected core network;

g) informing the radio network of information related to

the selected core network; and

h) communicating messages between the mobile station and the radio network, the message having a different data format according to the operating type of the core network.

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2. The method as recited in claim 1, wherein the step a) includes:

a1) receiving core network operating type information; and

10 a2) determining whether the core network connected to the asynchronous mobile communication system is a synchronous core network, asynchronous core network or both of the synchronous and the asynchronous core networks, based on the operating type of the core network.

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3. The method as recited in claim 2, wherein the step b) includes:

b1) if the core network coupled is the asynchronous core network, setting the core network operating type information
20 in the system information message as "0";

b2) if the core network coupled is the synchronous core network, setting the core network operating type information as "1"; and

25 b3) if both of the asynchronous core network and the synchronous core network are coupled to the mobile communication system, setting the core network operating type information as "0 & 1".

4. The method as recited in claim 1, wherein the step c) includes the steps of:

c1) receiving the system information message;

5 c2) extracting the core network operating type information from the system information message;

5. The method as recited in claim 4, wherein the step e) includes the steps of:

10 e1) if the core network operating type information represents that two core networks are coupled thereto, extracting the information related to the core network from the system information message;

15 e2) comparing the information related to the core network with information stored in the mobile station and corresponding to the information related to the core network; and

e3) selecting one core network to be coupled thereto based on a comparison result.

20 6. The method as recited in claim 3, wherein the core network operating type information and the information related to the core network are inserted into a master information block of the system information block.

25 7. The method as recited in claim 5, wherein the system information message is transmitted to the mobile station

through a broadcast channel (BCCH).

8. The method as recited in claim 1, wherein, if the selected core network is of the synchronous operating type, the message includes new information elements related to the synchronous core network.

9. The method as recited in claim 5, wherein, if the core network coupled to the asynchronous mobile communication system is of the asynchronous operating type, the information related to the core network includes a public land mobile network (PLMN) identity.

10. The method as recited in claim 5, wherein, if the core network coupled to the asynchronous mobile communication system is of the synchronous operating type, the information related to the core network includes a protocol revision (P_REV), a minimum protocol revision (MIN_P_REV), a network identity (NID) and a system identity (SID).

11. The method as recited in claim 5, wherein, if the core network coupled to the asynchronous mobile communication system is of the synchronous operating type, the information related to the core network includes a public land mobile network (PLMN) identity, a protocol revision (P_REV), a minimum protocol revision (MIN_P_REV), a network identity (NID) and a system identity (SID).

12. The method as recited in claim 11, wherein the step e2) includes the steps of:

e21) if the extracted PLMN identity is equal to a PLMN identity of the mobile station and the extracted MIN_P_REV is larger than a mobile protocol revision (MOB_P_REV) of the mobile station, selecting the asynchronous core network;

e22) if the extracted PLMN identity is not equal to the PLMN identity of the mobile station and the extracted MIN_P_REV is equal to or smaller than the MOB_P_REV of the mobile station, selecting the synchronous core network; and

e23) if the extracted PLMN identity is equal to the PLMN identity of the mobile station and the extracted MIN_P_REV is equal to or smaller than the MOB_P_REV of the mobile station, selecting the synchronous core network by using a core network selection method.

13. The method as recited in claim 12, wherein, if the core network is neither the asynchronous core network nor the synchronous core network, going back to step c1).

14. The method as recited in claim 12, wherein in the core network selection method, one core network is selected based on a number of transmission channels, a kind of systems and a kind of service provided by the mobile station, a transmission power of the mobile station and a frequency band occupied by the mobile station.

15. A method for transmitting a message between an asynchronous mobile communication system and at least a core network, the mobile communication system having a mobile station and a radio network, the method comprising the steps of:

a) at the radio network, discriminating an operating type of a core network(s) coupled thereto;

b) generating and transmitting a system information message having core network operating type information and information related to the core network;

c) if one core network is coupled to the asynchronous mobile communication system, communicating messages between the mobile station and the radio network, the message having a different data format according to the operating type of the core network;

d) if two or more core networks are coupled to the asynchronous mobile communication system, receiving an operating type of a core network selected by the mobile and communicating messages between the mobile station and the radio network, the message having a different data format according to the operating type of the core network.

16. The method as recited in claim 15, wherein the step a) includes:

a1) receiving core network operating type information; and

a2) determining whether the core network connected to the

asynchronous mobile communication system is a synchronous core network, asynchronous core network or both of the synchronous and the asynchronous core networks, based on the operating type of the core network.

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17. The method as recited in claim 16, wherein the step b) includes:

b1) if the core network coupled is the asynchronous core network, setting the core network operating type information in the system information message as "0";

b2) if the core network coupled is the synchronous core network, setting the core network operating type information as "1"; and

b3) if both of the asynchronous core network and the synchronous core network are coupled to the mobile communication system, setting the core network operating type information as "0 & 1".

18. A method for transmitting a message between an asynchronous mobile communication system and at least a core network, the mobile communication system having a mobile station and a radio network, the method comprising the steps of:

a) at the mobile station, discriminating the operating type of the core network(s) based on a system information message received from the radio network;

b) if one core network is coupled to the asynchronous

mobile communication system, operating a call control entity and a mobility management entity according to the operating type of the core network;

c) if two or more core networks are coupled to the asynchronous mobile communication system, at the mobile station, selecting one core network to be communicated with, based on the system information message;

d) operating a call control entity and a mobility management entity according to an operating type of the selected core network;

e) informing the radio network of information related to the selected core network; and

f) communicating messages between the mobile station and the radio network, the message having a different data format according to the operating type of the core network.

19. The method as recited in claim 18, wherein the step a) includes the steps of:

a1) receiving the system information message;

a2) extracting the core network operating type information from the system information message;

20. The method as recited in claim 19, wherein the step c) includes the steps of:

c1) if the core network operating type information represents that two core networks are coupled thereto, extracting the information related to the core network from

the system information message;

c2) comparing the information related to the core network with information stored in the mobile station and corresponding to the information related to the core network;
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c3) selecting one core network to be coupled thereto based on a comparison result.

21. The method as recited in claim 19, wherein the core network operating type information and the information related to the core network are inserted into a master information block of the system information block.
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22. The method as recited in claim 21, wherein the system information message is transmitted to the mobile station through a broadcast channel (BCCH).
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23. The method as recited in claim 18, wherein, if the selected core network is of the synchronous operating type, the message includes new information elements related to the synchronous core network.
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24. The method as recited in claim 20, wherein, if the core network coupled to the asynchronous mobile communication system is of the asynchronous operating type, the information related to the core network includes a public land mobile network (PLMN) identity.
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25. The method as recited in claim 20, wherein, if the core network coupled to the asynchronous mobile communication system is of the synchronous operating type, the information related to the core network includes a protocol revision (P_REV), a minimum protocol revision (MIN_P_REV), a network identity (NID) and a system identity (SID).

26. The method as recited in claim 20, wherein, if the core network coupled to the asynchronous mobile communication system is of the synchronous operating type, the information related to the core network includes a public land mobile network (PLMN) identity, a protocol revision (P_REV), a minimum protocol revision (MIN_P_REV), a network identity (NID) and a system identity (SID).

27. The method as recited in claim 21, wherein the step e2) includes the steps of:

e21) if the extracted PLMN identity is equal to a PLMN identity of the mobile station and the extracted MIN_P_REV is larger than a mobile protocol revision (MOB_P_REV) of the mobile station, selecting the asynchronous core network;

e22) if the extracted PLMN identity is not equal to the PLMN identity of the mobile station and the extracted MIN_P_REV is equal to or smaller than the MOB_P_REV of the mobile station, selecting the synchronous core network; and

e23) if the extracted PLMN identity is equal to the PLMN identity of the mobile station and the extracted MIN_P_REV is

equal to or smaller than the MOB_P_REV of the mobile station, selecting the synchronous core network by using a core network selection method.

5 *ok* 28. The method as recited in claim 27, wherein, if the core network is neither the asynchronous core network nor the synchronous core network, going back to step c1).

ok 29. The method as recited in claim 27, wherein in the
10 core network selection method, one core network is selected based on a number of transmission channels, a kind of systems and a kind of service provided by the mobile station, a transmission power of the mobile station and a frequency band occupied by the mobile station.

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